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ABSTRACT

Behavioral measurement using untrained organizational members as raters is highly dependent on heuristic or automatic processes. Such processes direct attention, simplify encoding and storage, and guide recall of behavioral information by using pre-existing schema to simplify processing; however, such processing results in systematic rather than random measurement error. Data from four previous studies of implicit leadership theories illustrate the effects of automatic processing guided by category prototypes on behavioral ratings. Results show that the effects on LBDQ (Leader Behavior Description Questionnaire) ratings of both behavioral information and bogus performance feedback depend on the prototypicality of a particular LBDQ item to the category "leader." Thus, automatic processing creates several potential problems pertaining to the conduct of scientific research in industrial/organizational psychology, including: (1) the use of empirical data generated by naive human observers; (2) an over-estimation of the consistency in human behavior; (3) the inability of psychometric theory to identify or correct systematic errors; (4) the intercorrelation of behaviors and of traits from the same source; (5) the manipulation of certain factors by researchers to control schema; and (6) the differences of automatic and controlled processing. (Author/JAC)

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Heuristic Social Information Processing and Its Implications for Behavioral Measurement
An Example Based on Leadership Categorization

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Heuristic Social Information Processing and Its Implications for Behavioral Measurement: An Example Based on Leadership Categorization

This paper argues that I/O psychologists have generally assumed humans are logical, efficient, and relatively precise information processors. These assumptions are inherent in many questionnaire based measurement techniques such as those used in leadership. As shown in the top third of Figure 1, the classical measurement model used to help interpret most behavioral ratings, assumes that the information needed to complete questionnaires has been effectively processed by respondents. That is, stimulus information (A_1 to C_3) has been observed, encoded, and stored and later on can be recalled (A_1 to A_3) when needed to make judgments required by questionnaires (RA_1 to RA_3). Though errors may occur, they are thought to be random (dashed lines in Figure 1) and, therefore, can be reduced by aggregating over raters. Current psychometric techniques only estimate the amount of random error in a measure. Unfortunately, no serious attempt is made by most researchers to distinguish between valid variance and systematic measurement error.

However, I would argue that such a model is unreasonable given the excessive cognitive demands placed on raters when completing descriptive questionnaires. Standardized questionnaires are typically completed by respondents who only incidentally attended to the "measured" behavior at some unspecified past occasion. Moreover, respondents are usually required to rate many different types of behavior of the person in question. No provisions are made to skip items that do not apply to the person being rated or the context being considered. Similarly no provisions are made to skip items for which relevant information has been forgotten or never was observed. Finally, to complete each item respondents often must make difficult probability judgments or frequency estimates rather than merely recalling a specific behavior or event.

In short, many measurement procedures require that the behavioral information needed by researchers has been observed, encoded, stored, accessed, and accurately translated into the terms contained in the measurement questionnaire. Unfortunately, these requirements conflict with many human information processing limitations that are widely recognized by cognitive psychologists. That is, human attention is highly selective; most information to which we do attend is not stored in long-term memory; the information that is stored is usually translated into terms that are more meaningful to subjects but not necessarily to the psychological researcher; humans often have accessing problems that prevent them from recalling information at a particular point in time that could be recalled easily on other occasions; and, finally, memory errors are often systematic rather than random since we often reconstruct plausible scenarios when details of specific events cannot be retrieved from memory. Thus, the classical measurement model does not correspond to the way humans normally process information.

The present paper provides an alternative view of the human social information processor that is consistent with extant beliefs concerning limitations of human information processors. This model is presented in the middle panel of Figure 1. The research used to illustrate the effects of this alternative viewpoint comes primarily from one content domain: leadership perception and memory for leadership traits and behaviors. However, research dealing with social cognitions suggests that the principles involved are quite general.

As shown in Figure 1, it is argued that humans rely extensively on heuristic or automatic processes (Feldman, 1981; Shiffrin & Schneider, 1977; Schneider & Shiffrin, 1977; Taylor & Fiske, 1978) which reduce information processing demands while still yielding reasonable, albiet suboptimal,

performance. That is. perceivers simplify perceptions of complex social stimuli by clasifying them into already existing, contextually meaningful categories, i.e., leader/nonleader (Lord, Foti. & Phillips, in press) Once so classified, subsequent information processing can rely primarily on these well learned schema (category prototypes) rather than the observed stimulus characteristics. Though cognitively economical, reliance on prototypes as an information processing aid results in systematic distortions of stimulus descriptions (e.g., RA_4 & RA_5). In addition, reliance on such automatic processes will reduce the relationship of "behavioral ratings" to the behaviors psychologists want to measure. Particularly troublesome is the possibility that "sensible" ratings (RD_1 to RD_5) can be produced for behaviors that were never seen (see Rush, Thomas, & Lord, 1977 for an extensive demonstration of this point).

Insert Figure 1 about here

A third model, the controlled processing model, is presented in the bottom panel of Figure 1. It is included to illustrate that humans can process information according to consciously directed strategies. Although such processing may be more accurate, i.e., there are fewer and less severe filtering and transformational operations, this model cannot handle as much stimulus information. Moreover, raters may still be forced to rely on heuristic processes when asked to make ratings for behaviors that weren't observed (RA_2, to RA_5, RD_1 to RD_4). Controlled processing will not be discussed extensively, because it would occur only under unusual circumstances, i.e., low amounts of information, low concurrent information processing load, and instructions to observe and remember behavior.

In the following section of the paper I will describe some of our recent research concerned with leadership descriptions and their relation to implicit leadership theories. Then I will describe in more detail the automatic processing model with which these results can be explained. Finally, I will

discuss the implications of this view of social information processing for the more general issues of how we conduct "scientific" research and how we develop and evaluate measuring instruments.

Leader Behavior Descriptions and Implicit Theories

During the past 20 years, most research in the leadership area has focused on explaining the consequences of different leadership styles, and much of this research has measured leadership style using one of the leadership scales developed at Ohio State in the 1950's. Of these scales, the Leadership Behavior Description Questionnaire (LBDQ) (Stogdill, 1963) is perhaps the most widely used measure of leadership behavior. The complete LBDQ consists of 12 factor analytically derived dimensions, although researchers frequently only use two of these dimensions--Consideration (C) and Initiating Structure (IS)--to describe leadership behavior. Items on both the C and IS scales require that raters use a five point scale (never to always) to describe the frequency with which the leader in question engaged in ten separate behaviors. These two LBDQ scales have generally been reported to have good reliability, but until recently their validity as measures of consideration and initiating structure behaviors had not been investigated extensively.

Several recent studies have reported results which we believe forces one to question the validity of the LBDQ as an accurate description of behaviors produced by the leader being rated. Rush, Thomas, and Lord (1977) found that the factor structure (pattern of item loading) for the C and IS scales obtained from rating real leaders could be adequately reproduced when subjects rated a fictitious leader for whom they had no behavioral information. Further, they compared factor structures for several samples that differed in the degree of familiarity of raters with ratees and presumably the amount of behavioral information to which raters were exposed. Their results indicated a high degree of congruence in factor structure for these five different samples. Their main

conclusion was that the interrelations among LBDQ items could be explained in terms of the implicit leadership theories held by raters. Further, when rating even very familiar leaders, it is not necessary to assume item covariances reflect only the actual covariances among behaviors exhibited by the rated leaders; they may also reflect distortions produced by subject's implicit theories.

A second finding bearing on the validity of the LBDQ is that the scores for many of the 12 scales (and especially for the IS scale) can be systematically affected by performance information. That is, if subjects were told that leaders performed well, their IS ratings for those leaders increased; if they were told that leaders performed poorly, their IS rating decreased. This performance cue effect (PCE) has been widely replicated by several groups of researchers (Gioia & Sims, Note 1; Larson, in press; Lord, Binning, Rush, & Thomas, 1978; Mitchell, Larson, & Green, 1977; Phillips & Lord, in press; Rush, Phillips, & Lord, 1981; Rush, Thomas, & Lord, 1977). Results indicate that equivalently large PCE distortions are produced whether performance cues are given before or after behavior is observed (Larson, in press; Mitchell et al., 1977), suggesting that retrieval related processes are of primary importance. Interestingly, the size of the PCE increases when the rated behavior hasn't been observed (Gioia & Sims, Note 1; Rush et al., 1977) or when there is a time delay between observing stimulus behavior and making behavioral ratings (Rush, Phillips, & Lord, 1981).

A final point concerning the validity of the LBDQ deserves mention; namely, that studies exploring the impact of clear differences in stimulus IS behavior found that these true behavioral differences produced much larger changes in IS ratings than did bogus performance information (Lord et al., 1978). Further, these behavioral effects were undiminished for delayed as

compared to immediate behavioral ratings (Rush et al., 1981). It is also worthy of note that in both the immediate and delayed rating conditions of the Rush et al. study, all of this "behavioral" variance in IS ratings could be eliminated by statistically controlling for a single item measure of amount of leadership exhibited. Further, controlling for this global leadership rating also eliminated the PCE (Phillips & Lord, in press; Rush et al., 1981). Thus, subjects seem to assimilate both behavioral and performance related information into a general leadership impression that is later used to produce behavioral ratings. One model of how such an assimilation could occur is described in the next section of this paper.

Before discussing how questionnaire respondents may process social information, it should be pointed out that the information processing requirements in most of the studies cited above differ from those typical of questionnaire use in three important respects. First, in most cases subjects were instructed to pay careful attention to the target leader's behavior and were aware that they would be subsequently rating behavior. Real-world raters usually do not know that they will subsequently make descriptive ratings when exposed to relevant behaviors. Second, experimental subjects were shown clear behavioral examples and were not distracted by other tasks. Real-world raters, on the other hand, must deal with ambiguous behaviors as well or those that are clearly relevant to rating scales. Moreover, they are often occupied by other cognitive activities with task, social or self-relevance when important behavior occurs. Third, experimental subjects typically rate behavior a few minutes after observing stimuli, while real-world raters generally make a rating weeks or months after observing relevant behaviors. The effect of each of these differences would be to increase the effects on behavioral ratings from real-world raters of mechanisms that automatically direct attention, facilitate

cognitively efficient encoding and storage, or aid in accessing stored information.

Automatic Processing of Behavioral Information

It has been argued that the processing of behavioral information in real-world situations occurs under cognitively demanding circumstances in which the encoding and storge of social data may not be the primary concern of the human information processor. This conclusion implies that much behavioral data would be processed automatically (Feldman, 1981; Schnieder & Shiffrin, 1977; Shriffrin & Schnieder, 1977; Taylor & Fiske, 1979) with minimal conscious control or awareness. Moreover, this automatic processing would be highly dependent on well learned schema or categories that seem relevant to the situation in which behavior occurred. However, these schema are not necessarily relevant to the behaviors that will be measured subsequently.

By automatic processing we mean processing that occurs without intent or conscious monitoring (although the results of such processing may become conscious) and processing that places little strain (load) on higher level cognitive functioning (e.g., thinking). For example, when driving a car, environmental information may be processed and reacted to automatically, leaving higher level capacities free for conversation or thinking. Hasher and Zacks (1979) propose that automatic memory processes do not interfere with other cognitive activities since they drain minimal energy from humans limited-capacity attentional mechanism. They argue that there are certain types of information (spatial, temporal, and frequency-of-occurrence information) which we are genetically prepared to encode and other types for which automatic encoding is produced by practice (e.g., reading). We would add that automatic processing can also occur for information relevant to familiar categories or schema (Shiffrin & Schnieder, 1977). By schema we mean knowledge structures

that organize and direct information processing. Schema have typically been conceptualized by social psychologists as abstract mental organizations or memory structures (Hastie, 1981), but schemas have also been related to control of attention (Shiffrin & Schnieder, 1977), perception (Neisser, 1976), and behavioral responses (Carver & Scheier, 1981).

One type of schema that we believe is particularly important to social information processing is central tendency or prototypic schema (Hastie, 1981). Rosch (1980) argues that reliance on such schema helps us organize our world into a limited (though still quite large) number of hierarchically organized categories; it is through the use of such categories that we automatically recognize members of categories such as chairs (Rosch, 1980), extroverts (Cantor & Mischel, 1979), or leaders (Lord et al., 1981). Futher, as Hastie (1981) has convincingly asserted, information relevant to such schemas is more easily recalled.

Attention. Prototypic or central tendency schema have been related to several stages of information processing relevant to completing behavioral questionnaires--attention, encoding, recall, and judgment--and each of these processes can occur automatically. Schnieder and Shiffrin (1977) provide extensive evidence indicating that selective attention is directed, in part, by categories that are stored in long-term memory. This process is automatic in that attention is triggered by a match between appropriate inputs and existing categories (schemas), not by conscious strategies of subjects.

In social information processing, there are many potential schema that could be used to direct attention. A recent article by Hoffman, Mischel, and Mazze (1981) indicates that the type of schema which are actually used my depend on the observational purpose of subjects. When subjects were told that they would be asked to recall material or empathize with the character in a series of written episodes, they organized information around goal-like schema when

directed to form an impression or predict behavior, trait based categories were used to organize information. Further, Hoffman et al. argue that retrieval of behavioral information may depend on an interaction between the type of behavior and the type of category used in encoding. This result may stem, in part, from the fact that schema irrelevant behaviors are never attended to in social situations since they don't trigger attentional responses via automatic processes (e.g., behaviors C_1 to C_3 in the middle panel of Figure 1).

The choice of relevant schema also depends on the information to which one is exposed. Exposure to behavioral instances of a trait prime the relevant schema, making the trait more accessible (Srull & Wyer, 1979) and more likely to be used to organize information. A similar process is involved in recognition: exposure to a stimulus with a sufficient proportion of characteristics relevant to a particular category allows us to automatically categorize or recognize the stimulus as a category member (Rosch, 1978). Thus, as Neisser (1976) has argued, it is the interplay between schema and stimulus attributes that guides perception. We automatically attend to features (or behaviors) pertinent to appropriately categorizing stimuli, and the relevant categories are elicited in part by the pattern of features to which we are exposed.

As shown in Figure 1, description of selective attention and perception differs substantially from the implicit assumptions in questionnaire measurement. We maintain that people primarily attend to information with diagnostic value for categories that were temporarily made salient by primes, observational purposes or contextual factors. Most other information is lost at this early information processing stage. Hence, much of the behavioral information needed by researchers may never have been noticed by raters.

Encoding. It is probable that the same processes which direct attention "set the stage" for encoding. That is, information may be encoded in terms of

the categories by which stimuli are recognized. Both Cantor and Mischel (1979) and Rosch (1978) maintain that categorical structures provide an efficient means for encoding information as well as a basis for recognizing category members. According to their viewpoint, stimuli would be labeled or "tagged" in terms of the relevant category, and for the most part, they would be viewed as possessing the features most prototypical or representative of that category.

Two points concerning encoding are particularly important. First, as Hansen (1980) argues, attributions of personal qualities follow a cognitively economical "confirmatory" strategy in which observers attempt to verify existing beliefs. Thus, attribution of personal qualities may be a simple process in which attributors try to confirm that the stimuli in question belongs in the category evoked by its salient characteristics, rather than more cognitively demanding logical inference process (Lord & Smith, Note 5).

Second, although individual characteristics or behaviors may provide the basis for perception, these separate data points are encoded and stored as a whole (Wyer, 1980). For example, we may perceive an individual as having exhibited leadership and store that conclusion, without also encoding and storing the particular behaviors upon which that conclusion was based. Thus, as Rosch (1978) and Cantor and Mischel (1979) have explained, our infinitely complex world of stimuli is made more orderly by grouping nonidentical but similar stimuli into equivalent classes. In so doing, stimuli become meaningful as category members not as unique sets of features. Subsequent information processing operates for the most part on category not stimulus features. Thus, individuals labeled as leaders would be treated as possessing characteristics prototypical of leaders in general. Though such a process is cognitively economical, it may also produce systemtic biases in recall of leader relevant information.

One interesting effect of encoding in terms of labels rather than their constituent behaviors is that labels can be easily integrated with other knowledge structures or modified by subsequent information. Thus, trait labels like leadership can be assimilated with implicit personality theories or can be modified by subsequent performance information. However, such post-encoding changes in labels would also produce distorted "recall" of the constituent behaviors if memory is guided by the label appropriate to a stimulus person when their behavior is being recalled.

Recall. There is overwhelming evidence indicating that remembering information is highly dependent on the category or schema with which it was encoded. Hastie (1981) has conducted an impressive review of the literature bearing on schema effects on memory and concluded that memory for schema relevant information is much better than for schema irrelevant information. However, schema directed memory is susceptible to several systematic biases.

One particularly interesting bias is the "point-of-view" effect in which information relevant to the point of view espoused at recall affects the information recalled. For example, Anderson and Pichert (1978) manipulated the perspective at retrieval by asking subjects to imagine that they were either prospective burglars or home buyers and found significant effects on the recalled details from a previously read story. This suggests that memory involves a working backward (search) from a current perspective through relevant knowledge structures to the desired information. Information irrelevant to that perspective often cannot be accessed although it may be retrieveable at some other point in time.

Such a process may help to explain the performance induced distortions in LBDQ ratings discussed earlier. Subjects given a good performance cue may infer leadership occurred, adjust their estimate of the target person's leadership,

and then "recall" behavior consistent with this perspective; bad performance feedback implies little leadership, reductions in perceived leadership, and recall of behaviors consistent with this perspective.

This explanation of the performance cue effect implicates selective retrieval of observed behaviors; however, reconstruction or false recognition of schema consistent information that was never observed may also help produce the PCE. Reconstructive errors can be explained by the way information is encoded and stored. Rosch (1978) argues that all members of a particular category would be treated equivalently and Wyer (1980) maintains that information is stored as a "whole". These perspectives imply that observers would falsely recall unseen behaviors that were prototypical (highly representative) of the category used to classify the target person. In other words, they would falsely ascribe to a specific leader behaviors that were generally true of leaders, i.e., RA_4 and RA_5 in the middle panel of Figure 1.

This type of reconstructive error has been frequently reported in the literature on memory for social information. Hastie's (1981) recent review describes several studies using recognition memory measures (which closely parallel the format of most descriptive questionnaires), in which false alarm or lure items (items that were never seen but are consistent with relevant prototypes) were recognized as having been seen with a high degree of confidence. This reconstructive error is exactly what seems to have occurred in the well known study of Canter and Mischel (1977) on the effects of prototypes relevant to introversion and extroversion.

A more recent study in the leadership domain (Phillips & Lord, Note 2), in which all subjects viewed the same behavioral episode, replicated and extended Cantor and Mischel's (1977) finding. They found that good, but bogus, performance feedback increased recognition ratings for prototypically effective

leadership behaviors and decreased ratings for prototypically ineffective behaviors. Bad performance feedback produced the opposite effect, increased recognition for ineffective behaviors and decreased recognition for effective behaviors. Moreover, this effect occurred for both observed and unobserved behaviors. However, for prototypically neutral (ambiguous) behaviors, performance cues had no effect on recognition.

In addition, Phillips and Lord found that subjects exhibited little ability to accurately distinguish between seen (behaviors A_1 to A_3 in the middle panel of Figure 1) and unseen (behaviors A_4 and A_5) behaviors that were prototypical of effective or ineffective leaders, but there was a marked difference in recognition for observed and unobserved behaviors that were unrelated to leadership prototypes. Thus, when possible, subjects seemed to base behavioral ratings on the cognitively simple, prototypic based procedure we have described; when not possible, a more accurate, behavior specific process seemed to be used. Thus, at least in the Phillips and Lord study subjects seem to be using <u>both</u> automatic and controlled information processing with a bias toward the more cognitively efficient automatic processes. Controlled processes seemed especially likely in that study since subjects were instructed to carefully process behavioral information and were forewarned of the recall test.

To summarize, we have argued that automatic processing involves schema directed attention, encoding, and recall. This is a cognitively efficient way to process schema relevant information, but it often leads to erroneous recall or recognition of unseen but schema consistent information. Controlled processing may be more accurate under ideal conditions (e.g., plenty of time, clear behaviors, immediate recall) but may not occur under many common circumstances. We might ask how well this viewpoint accounts for results of the leadership rating studies associated with implicit leadership theories: and, we

might also ask what broader implications this perspective has for measurement and the conduct of scientific inquiry. These two issues are addressed in the final two sections of this paper.

Item Prototypicality and Leadership Ratings

The most widely replicated effect associated with implicit leadership theories is the performance induced distortion in LBDQ ratings. We have argued the PCEs could be produced by either selectively retrieving or falsely recognizing questionnaire items that were prototypical of the category label guiding recall. If true, more prototypical items should be distorted more by bogus feedback than less prototypical items. Such an effect has been reported by Lord, Foti, and Phillips (1981) and is consistent with the results of the Phillips and Lord (Note 2) study previously discussed.

Moreover, if such distortions result from the way humans typically process social information, they should also be produced by behavioral differences that induce different leadership labels. For example, given two different behavioral stimuli, one characteristic of typical leaders and one characteristic of typical nonleaders, the extent to which questionnaire items would reflect such differences would vary with their prototypicality.

In this section of the paper we will present reanalyses of several previous studies of implicit leadership theories that attempt to tie both behavioral and performance cue effects to the prototypicality of a given LBDQ item. To do this, we had independent samples of subjects rate the prototypicality of each LBDQ item (see Fraser, Lord, & Cronshaw, Note 3, for a more complete description of this process). Then for each study we correlated mean prototypicality ratings with measures of both the PCE and behavioral effect for each LBDQ item. The item PCE, a measure of the size of the performance induced distortion, is simply the mean item rating in good feedback conditions minus the mean in poor feedback

conditions. The item "behavioral" effect, a measure of the size of the behavior induced distortion, is the item mean for subjects viewing high initiating structure tapes minus the mean for subjects viewing low structure tapes.

Insert Table 1 about here

As can be seen in Table 1, all of the correlations were in the predicted directions and most were statistically significant for the PCE. Although all correlations with PCE were relatively high, the correlation was highest for the Rush et al. (1977) study which reported the largest PCE, and the lowest correlation was for the Fraser and Lord study which only reported a marginally significant PCE.

The correlations of behavioral effects with prototypicality ratings were more varied, but were still significant for two of the three studies. Nevertheless, these varied results raise the question of how these three studies differed. One potentially important difference is that in the Lord et al. (1978) study subjects were run in separate booths seated about three feet from a large color videotape monitor under what must be considered close to ideal conditions; on the other hand, both Rush et al. (1981) and the Fraser and Lord ran subjects in classrooms in fairly large groups. For these two studies, subjects were seated 10 to 25 feet from monitors and occasional distractions occurred. Thus, it is likely that subjects were better able to utilize controlled processes in the Lord et al. study. In support of this contention, the percentage of variance in LBDQ ratings explained by behavioral effects was much larger in the Lord et al. study (53% for the IS scale) as compared to the Rush et al. (18% for the IS scale) and the Fraser and Lord (38% for the IS scale) studies.

A second difference pertained to the stimulus tapes used. The Lord et al. and Rush et al. studies used the same stimulus tape, while the Fraser et al. tape was different. Both sets of tapes were carefully constructed so that leaders exhibited more initiating structure behaviors in one tape than the other; however, the actors and tasks differed. Interestingly, in the Fraser and Lord study leaders in the high and low structure conditions were also rated as being significantly different in consideration, "behavioral" effects were significantly correlated with leniency ratings, and the performance cue effect was not significant although the size of this effect was highly correlated with prototypicality ratings. This suggests that subjects in this study relied more on constructs other than leadership (e.g., niceness) to make behavioral ratings.

The third important difference among these studies pertains to the number of scales used to make ratings. The Lord et al. (1978) study used the full 100 item LBDQ, the Rush et al. (1981) study used only 4 scales (40 items), and the Fraser and Lord study used only the 20 items from the C and IS scales. If we calculate the correlation between prototypicality and the behavioral effect for the Lord et al. study using only the 40 items used in the Rush et al. (1981) study, the correlation increases to .65 which is quite close to the finding from the Rush et al. data ($r = .60$). However, if only the 20 items used in the Fraser & Lord study are analyzed for the Lord et al study, the correlation is substantially reduced ($r = .27$, $p > .10$). Thus, the extent to which "behavioral" information based on differences between stimuli in intiating structure can be explained by prototypicality of items to the "leader" category varies with the LBDQ items chosen.

As a whole, the data reported in this paper are consistent with our contention that both behavior induced and performance induced changes in LBDQ ratings can involve the same basic perceptual-memory process. Both types of

information can produce adjustments in "leader" labels (Phillips & Lord, in press; Rush, et al., 1981) and as shown in Table 1, the impact of behavioral and performance information on LBDQ ratings generally depended on the prototypicality of items to the category "leader."

However, under the relatively ideal conditions we created, subjects did not have to rely solely on leaderhsip prototypes to make behavioral ratings. It is quite likely that some information processing stages, such as attention, involved controlled processes in all studies since subjects were instructed to observe the behaviors of specific stimulus people, while other stages such as encoding and recall were influenced more by automatic processes. It should be recognized, as Feldman (1981) has noted, that people can be categorized by either automatic or controlled processes; similarly, recall and judgment can involve either automatic or controlled processes. Finally, it should be noted that the actual frequency judgments required to rate each questionnaire item may involve either logical (controlled) decision making or more heuristic (automatic) processes. For example, Tversky and Kahneman (1974) maintain that frequency judgments often are made on the basis of heuristics such as availability, and more prototypical information is more available in memory (Rosch, 1975a; 1975b; Smith, Shoben, & Rips, 1974). In short, the relatively pure types of information processing presented in the bottom two-thirds of Figure 1 can be intermixed at any processing stage. Moreover, as Nisbett and Wilson (1977) state, subjects may not be very sensitive to their reliance on automatic as compared to controlled processing.

Certainly, much more research is needed to determine precisely how people make behavioral ratings. Such research might well focus on the differences between automatic or heuristic and controlled or logical processes. Feldman (1981) has analyzed this distinction in the context of performance evaluation,

and Lord and Smith (Note 5) have discussed this distinction as it applies to attribution theory. Also, these two types of information processing should be contrasted to the model implied by measurement theory.

The distinctions among these three models of behavioral ratings also have important consequences for the way we conduct behavioral science and the way we measure variables. These topics will be addressed briefly in the final section of this paper.

Consequences of Automatic Processing for Empirical Research

It has been argued that much behavioral data is produced by automatic information processes involving highly selective attention, encoding of summary information (category labels) into pre-existing categories, and biased retrieval (or reconstruction) from memory. These processes create several problems pertaining to the conduct of scientific research in the industrial-organizational area which will be discussed briefly.

1. Many areas of I/O research have relied on empirical procedures such as factor analysis to identify and refine basic constructs (e.g., leadership, behavior, organizational characteristics or climate, job characteristics, satisfaction, performance evaluation). Since almost all of the empirical data used in such analyses is originally generated by naive human observers, these inductive approaches to developing theoretical units will be constrained by human's automatic perceptual-memory schema. The resulting units may not be optimal for developing or testing explanatory theories, although they may be meaningful and easily used by most lay-people. Calder (1977) cogently discusses this problem with respect to leadership, but we believe this problem is pervasive in the I/O area.

2. A related problem is that reliance on data generated by automatic or heuristic processes will lead researchers to over-estimate the consistency in

human behavior since much of the consistency will stem from raters' distortions rather than objective behaviors (see Mischel, 1973, for an extensive discussion of this issue as it applies to personality traits). In other words, humans make the world seem more orderly than it actually is (Mervis & Rosch, 1981) by perceptually sharpening and homogenizing what are actually quite "fuzzy" categories (Cantor & Mischel, 1979). The danger for I/O is that we will mistakenly expect fuzzy categories--categories with heterogenous members and no clear-cut boundaries--to behave like consistent, well defined categories. Well defined categories may be very useful in areas such as selection or training, whereas fuzzy categories would not be. For example, statistical prediction based on fuzzy categories would not be very accurate, whereas prediction based on consistent categories would be more effective.

3. The psychometric theory which guides the development of empirical measures cannot easily identify or correct for systemtic errors (Campbell, 1976), yet these are the types of errors human raters are most likely to produce. Reliability estimates based on internal consistency, which are frequently the only information provided for measuring scales, will not provide adequate estimate of the proportion of error, and may have little relation to validity (Phillips & Lord, Note 2). Thus, as Schwab (1980) has argued, we must gear more of our research efforts to systematically validating measurement procedures.

4. Both behaviors and traits (dimensions) can be related to the same higher level contructs (categories) used by subjects to simplify information (Fraser, Lord, & Cronshaw, Note 3). Thus, intercorrelations among behaviors and intercorrelations among traits may arise from the same source, namely, distortions produced by assimilating social information into summary categories. Ironically, high correlations among behaviors have been viewed as desirable (e.g., high reliability); whereas, high correlations among traits have been

viewed as undesirable (e.g., halo) errors to be eliminated by altering rating formats or by training raters. Moreover, since the particular category that guides automatic processing may change over time (i.e., race at one time, leadership at another), neither internal consistency nor halo will be consistent across settings that elicit different bases for automatic processing of social information.

5. By manipulating factors such as salience, primes, labels, or instructions to subjects, researchers may be able to exercise substantial control over the schema used by subjects to process information. Thus, researchers wanting to support or refute the existent particular types of biases (sex, race, age) can undoubtedly create situations conducive to supporting their perspective. In other words, the extent to which we rely on a particular type of schema, category, or stereotype to help process information is an empirical question with inherently low generalizability; however, the extent to which some type of schema automatically guides social information processing (e.g. the use of automatic versus controlled processes) should be much more generalizable.

6. Finally, the parameters of automatic as compared to controlled processing may be substantially different. The type of error (random versus systematic), the length of time information is retained, the input requirements (researcher versus subject directed attention, low versus high peripheral information processing demands, use of researcher developed versus natural categories), and the output requirements (type of memory search used) may differ for controlled and automatic processing. Researchers interested in improving measurement need to further articulate such parameters and know which type of information processing a particular measurement technique is likely to elicit.

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Footnotes

The author would like to thank Scott L. Fraser for help in analyzing the results presented in Table 1.

Table 1

Correlations of LBDQ Item Prototypicality Ratings with Performance and Behavioral Efffects on Item Ratings

Study	N	Performance Effect	Behavior Effect
Rush et al. (1977)	100	.88**	NA
Lord et al. (1978)	100	.80**	.42**
Rush et al. (in press)	40	.80**	.60**
Fraser & Lord (Note 4)	20	.72**	.04

*p < .05
**p < .01

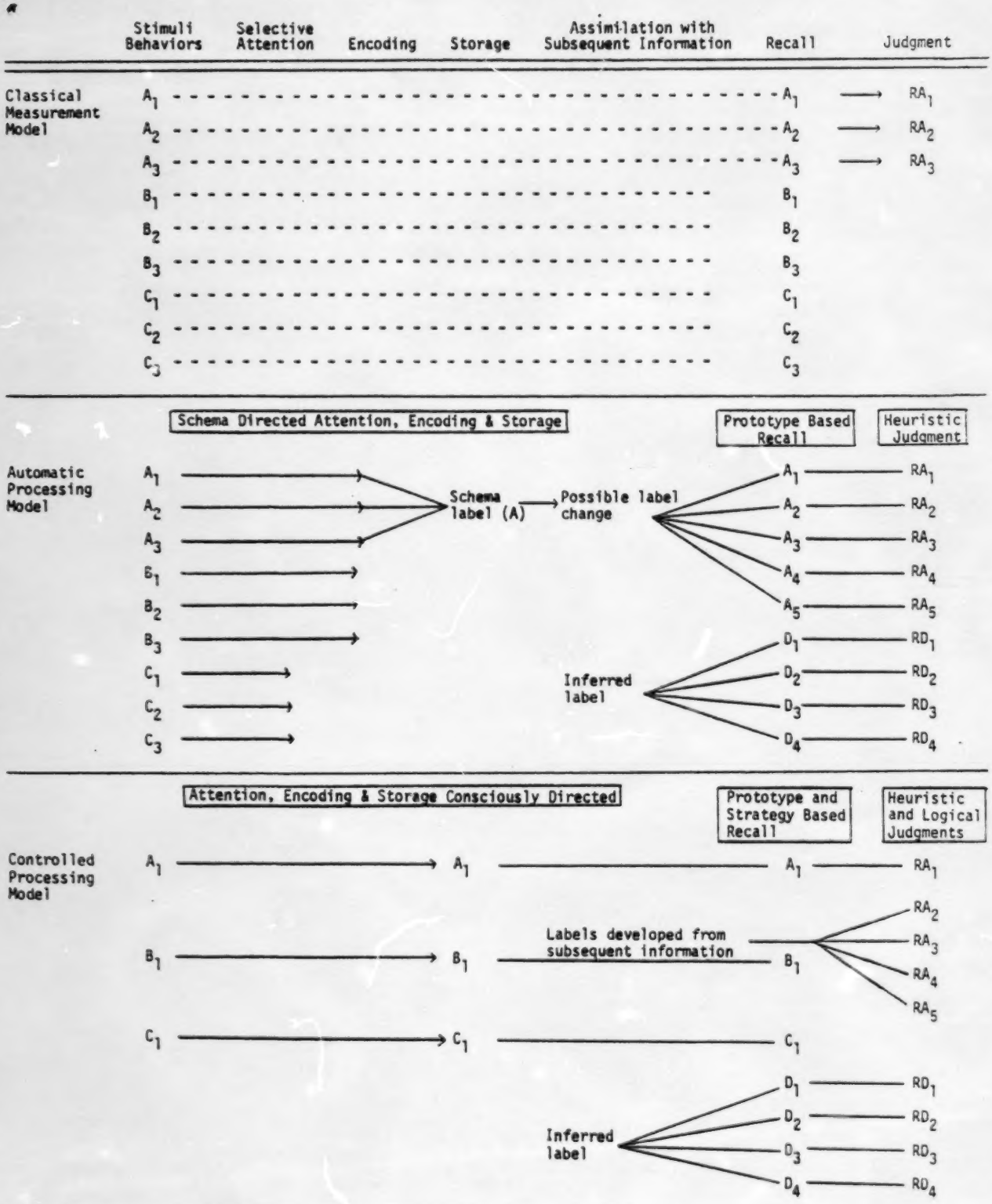

Figure 1. Information Processing Models for Behavioral Measurement. (A, B, and C are stimuli relevant schema, A and D are schema relevant to questionnaire items)